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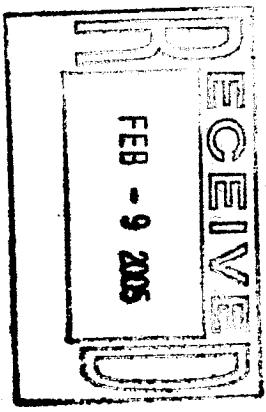
IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition

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IEEE 100 The Authoritative
Dictionary of IEEE Standards Terms

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The Authoritative Dictionary of IEEE Standards Terms

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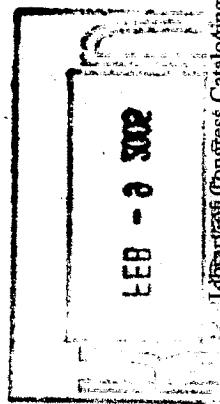
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The Authoritative Dictionary of IEEE Standards Terms

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current

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CSR space

cryptic storage A type of storage that uses the superconductive and magnetic properties of certain materials at temperatures near absolute zero. (C) 610,10-1994w

cryotron (1) A superconductive device in which current in one or more input circuits magnetically controls the superconducting-to-normal transition in one or more output circuits, provided the current in each output circuit is less than its critical value. *See also:* superconductivity.

(ED) [46]

(2) A device that makes uses of the effects of extremely low temperatures on conductive materials such that small magnetic field changes can control large current changes.

(C) 610,10-1994w

cryptography The discipline embodying principles, means, and methods for the transformation of data in order to hide its information content, prevent its undetected modification, and/or prevent its unauthorized use. (LM/C) 802.10-1992

(B) (communication practice) A piezoelectric crystal plate.

(C) (communication practice) A crystal rectifier.

crystal-controlled oscillator *See:* crystal oscillator.

crystal diode A rectifying element comprising a semiconducting crystal having two terminals designed for use in circuits in a manner analogous to that of electron-tube diodes. *See also:* rectifier.

(EEC/PE) [119]

crystal loudspeaker (piezoelectric loudspeaker) A loudspeaker in which the mechanical displacements are produced by piezoelectric action.

(EEC/PE) [119]

crystal microphone (piezoelectric microphone) A microphone that depends for its operation of the generation of electric charge by the deformation of a body (usually crystalline) having piezoelectric properties. *See also:* microphone.

(EEC/PE) [119]

crystal mixer (mixer) A crystal receiver that can be fed simultaneously from a local oscillator and signal source, for the purpose of frequency changing. *See also:* waveguide.

(Std100) [84]

crystal oscillator (crystal-controlled oscillator) An oscillator in which the principal frequency-determining factor is the mechanical resonance of a piezoelectric crystal. *See also:* oscillator.

(BT) 182A-1964w

crystal pickup (piezoelectric pickup) A phonograph pickup that depends for its operation on the generation of an electric charge by the deformation of a body (usually crystalline) having piezoelectric properties. *See also:* phonograph pickup.

(EEC/PE) [119]

crystal pulling A method of crystal growing in which the developing crystal is gradually withdrawn from a melt.

(IA) [12]

crystal receiver A waveguide incorporating a crystal detector for the purpose of rectifying received electromagnetic signals. *See also:* waveguide.

(AP/ANT) [35], [84]

crystals hierarchy (primary ferroelectric terms) Depending on their geometry, crystals are commonly classified into seven systems: triclinic (the least symmetrical), monoclinic, orthorhombic, tetragonal, trigonal, hexagonal, and cubic. There are 32 such crystal classes; 20 are piezoelectric. Piezoelectric crystals have the following property: if stress is applied along certain directions in the crystals, they develop an electric polarization whose magnitude is (within limits) proportional to the applied stress. Conversely, when an electric field is applied along certain directions in a piezoelectric crystal, the crystal is strained by an amount proportional to the applied field. Each crystal system contains at least one piezoelectric class. Ten of the 20 piezoelectric classes possess spontaneous electrical polarization; that is, they have a non-vanishing dipole moment per unit volume and are called polar. The ten polar crystal classes are designated 1, 2, m, 2mm, 4, 4mm, 3, 3m, 6, 6mm in the notation of Hermann and Maugin, C_1 , C_2 , C_{1h} , C_{2v} , C_4 , C_{3v} , C_3 , C_{6v} , respectively in the notation of Schoenflies. (UFFC) 180-1986w

CRYOGENIC STORAGE A type of storage that uses the growth of metal sulfide crystals upon metal surfaces with a sulfide finish and lacquer coating. The appearance of crystal spots is called spotting in. (EEC/PE) [119]

CRYSTAL-STABILIZED TRANSMITTER A transmitter employing automatic frequency control, in which the reference frequency is that of a crystal oscillator. *See also:* radio transmitter.

(AP/ANT) 145-1983s

CRYSTAL SYSTEMS The term "crystal" is applied to a solid in which the atoms are arranged in a single pattern repeated throughout the body. In a crystal the atoms may be thought of as occurring in small groups, all groups being exactly alike, similarly oriented, and regularly aligned in all three dimensions. Each group can be regarded as bounded by a parallelepiped and each parallelepiped regarded as one of the ultimate building blocks of the crystal. The crystal is formed by stacking together in all three dimensions replicas of the basic parallelepiped without any spaces between them. Such a building block is called a unit cell. Since the choice of a particular set of atoms to form a unit cell is arbitrary, it is evident that there is a wide range of choices in the shapes and dimensions of the unit cell. In practice, that unit cell is selected which is most simply related to the actual crystal faces and X-ray reflections, and which has the symmetry of the crystal itself. Except in a few special cases, the unit cell has the smallest possible size. In crystallography the properties of a crystal are described in terms of the natural coordinate system provided by the crystal itself. The axes of this natural system, indicated by the letters a, b, and c, are the edges of the unit cell. In a cubic crystal, these axes are of equal length and are mutually perpendicular; in a triclinic crystal they are of unequal lengths and no two are mutually perpendicular. The faces of any crystal are all parallel to planes whose intercepts on the a, b, c axes are small multiples of unit distances or else infinity, in order that their reciprocals, when multiplied by a small common factor, are all small integers or zero. These are the indices of the planes. In this nomenclature we have, for example, faces (100), (010), (001), also called the a, b, c faces, respectively. In the orthorhombic, tetragonal, and cubic systems, these faces are normal to the a, b, c axes, 100, etc. Even in the monoclinic and triclinic systems, these faces contain respectively, the b and c, a and c, and a and b axes. As referred to the set of rectangular axes X, Y, Z, these indices are in general irrational except for cubic crystals. Depending on their degrees of symmetry, crystals are commonly classified into seven systems: triclinic (the least symmetrical), monoclinic, orthorhombic, tetragonal, trigonal, hexagonal, and cubic. The seven systems, in turn, are divided into point groups (classes) according to their symmetry with respect to a point. There are 32 such classes, eleven of which contain enantiomorphous forms. Twelve classes are of too high a degree of symmetry to show piezoelectric properties. Thus twenty classes can be piezoelectric. Every system contains at least one piezoelectric class.

(UFFC) 176-1978s

CRYSTAL VIDEO RECEIVER A receiver consisting of a crystal detector and a video amplifier.

(EEC/PE) [119]

CSC *See:* communication services interface.

CSCL *See:* computer software configuration item.

C-SCOPE A cathode-ray oscilloscope arranged to present a C-scan. (AES/RS) 686-1990

CSMA/CD LAN (1) Any local area network using the CSMA/CD access protocol. (LM/C) 802.1H-1995

(2) An IEEE 802.3 LAN is a CSMA/CD LAN, as is an Ethernet LAN. Most CSMA/CD networks are hybrids, carrying both Ethernet and IEEE 802 style frames.

CSMP III *See:* Continuous System Modeling Program III.

CSR *See:* control and status register.

CSR ARCHITECTURE (1) IEEE Std 1212-1991, IEEE Standard Control and Status Register (CSR) Architecture for Microcomputer Buses. (C/M/M) 1596-1992

(2) Refers to IEEE Std 1212-1991, the parent document of this series. It specifies the overall architecture of a node on conformant standard buses and specifically the structure and use of its CSRs and standard ROM locations. (C/M/M) 1212.1-1993

(3) ISO/IEC 13213: 1994 [ANSI/IEEE Std 1212, 1994 Edition], Information technology—Microprocessor systems—Control and Status Registers (CSR) Architecture for microcomputer buses.

(4) Refers to IEEE Std 1212-1991.

(C/M/M) 1596.5-1993, 1212-1991s

(5) ISO/IEC 13213: 1994 [ANSI/IEEE Std 1212, 1994 Edition] Information technology—Microprocessor systems—Control and Status Register (CSR) Architecture for microcomputer buses.

(C/M/M) 1596.4-1996

(C/M/M) 1596.4-1995

(C/M/M) 1596.4-1997

(C/M/M) 1596.4-1998

(C/M/M) 1596.4-1999

(C/M/M) 1596.4-1999r

(C/M/M) 1596.4-1999w

(C/M/M) 1596.4-1999x

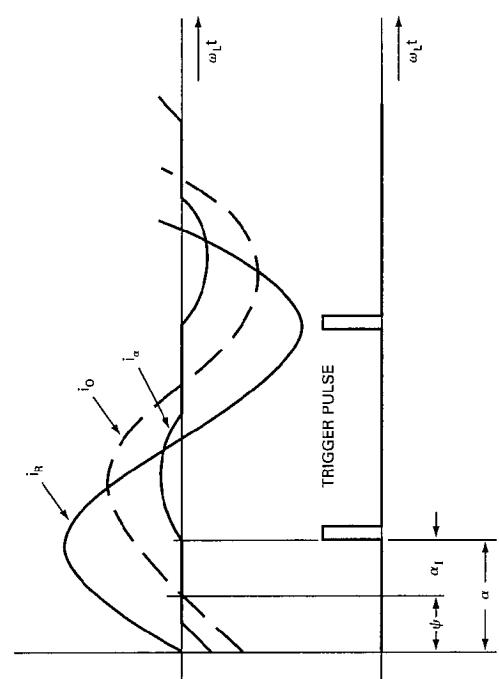
(C/M/M) 1596.4-1999y

(C/M/M) 1596.4-1999z

current-limiting characteristic curve

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current density



i_a = current in a control element with a trigger delay angle α and at the specified load
 α = angle of α and at the specified load
 α_1 = current delay angle
 ψ = angle between i_a and i_0

NOTE: In the case of a single phase controller, ψ is identical with the load power factor angle.

current delay angle

i_a = current in a control element with all control elements continuously gated and a resistive load
 i_0 = current in a control element with all control elements continuously gated and at the specified load

NOTE: In the case of a single phase controller, i_0 is in phase with the line voltage. The latter may be used as a convenient reference voltage to measure α .

i_0 = current in a control element with all control elements continuously gated and at the specified load

current instance The package instance whose private data is currently accessible.
current limit (1) The maximum output of the battery charger delivered to a discharged battery and load, usually stated as a percentage of output rating and with nominal input voltage supplied to the charger.
(2) A control function that prevents a current from exceeding its prescribed limits. *Note:* Current-limit values are usually expressed as percent of rated-load value. If the current-limit circuit permits the limit value to increase somewhat instead of being a single value, it is desirable to provide either a curve such as speed or to give limit values at two or more conditions of operation.

current density (1) A generic term used where there is no danger of ambiguity to refer either to conduction-current density or to displacement-current density, or to both.
(2) A vector-point function describing the magnitude and direction of charge flow per unit area. The preferred unit is amperes per square meter (A/m^2). (T&D/PE) 1227-1990

current derived voltage A voltage produced by a combination of currents. *Note:* (1) The element used to create this voltage in a pilot system is popularly referred to as a filter. A typical example is a filter that is supplied three-phase currents and produces an output voltage proportional to the symmetrical component content of these currents. (For example, $V_F = K_1 IA_1 + K_2 IA_2 + K_3 IA_0$ where IA_1 , IA_2 , and IA_0 are the symmetrical components of the A phase current and the K are weighting factors.)

current differential relay A relay designed to detect faults by measuring the current magnitude and phase angle difference between relay terminals of a transmission line.
(PE/PSR) C37.113-1999

current efficiency (specified electrochemical process) The proportion of the current that is effective in carrying out that process in accordance with Faraday's law. *See also:* electrochemistry.
(EEC/PE) [119]

current extent *See:* extensional set.
current generator (signal-transmission system) A two-terminal circuit element with a terminal current substantially independent of the voltage between its terminals. *Note:* An ideal current generator has zero internal admittance. *See also:* network analysis; signal.
(ED) 161-1971w

current injection method A synthetic test method in which the maximum peak current passed by a fuse and the correlated root-mean-square available current magnitudes under specified voltage and circuit impedance conditions. *Synonyms:* peak let-

current amplification (1) The ratio of the output current to the cathode current due to photoelectric emission at constant electrode voltages. *Notes:* 1. The term output current and photocathode current as here used does not include the dark current. 2. This characteristic is to be measured at levels of operation that will not cause saturation. *See also:* phototube.
(PE) 402-1974w

current compensation (excitation systems for synchronous machines) An element of the excitation system that acts to compensate for synchronous machine load current effects. *Notes:* 1. Examples are reactive current compensator and active current compensator. A reactive current compensator is a compensator that acts to modify the regulated voltage in accordance with reactive current. An active current compensator is a compensator that acts to modify the regulated voltage in accordance with active current. 2. Historically, terms such as equalizing reactor and cross current compensator have been used to describe the function of a reactive compensator. These terms are deprecated. 3. Reactive compensators are generally applied with synchronous machine voltage regulators to obtain reactive current sharing among synchronous machines operating in parallel. They function in the following two ways:

a) **Reactive droop compensation** is the more common method. It creates a drop in synchronous machine terminal voltage proportional to reactive current and equivalent to that which would be produced by the insertion of a reactor between the synchronous machine terminals and the paralleling point.
b) **Reactive differential compensation** is used where droop in synchronous machine voltage is not wanted. It is obtained by a series differential connection of the various synchronous machine, current transformer secondaries, and reactive compensators. The difference current for any synchronous machine from the common series current creates a compensating voltage in the input to the particular synchronous machine voltage regulator which acts to modify the synchronous machine excitation to reduce to minimum (zero) its differential reactive current.

4. Line drop compensators modify synchronous machine terminal voltage by regulator action to compensate for the impedance drop from the machine terminals to a fixed point in the external circuit. Action is accomplished by insertion of a voltage equivalent to the impedance drop within the regulator input circuit. The voltage across the resistance and reactance portions of the impedance are obtained, respectively, by an active compensator and a reactive compensator.
(PE/EPG) 421.1-1986r

current, average discharge *See:* average discharge current.
current balance ratio The ratio of the metallic-circuit current or noise-metallic arising as a result of the action of the longitudinal-circuit induction from an exposure on unbalances outside the exposure to the longitudinal circuit current or noise-longitudinal in sigma at the exposure terminals. It is expressed in microamperes per millampere or the equivalent. *See also:* inductive coordination.
(SWG/PE/PSR) C37.100-1992, C37.90-1978s

current-balancing device (thyristor) Device used to achieve satisfactory division of current among parallel connected semiconductor devices, for example, reactor, resistor, impedance.

current-balancing reactor A reactor used in semiconductor rectifiers to achieve satisfactory division of current among parallel-connected semiconductor diodes. *See also:* reactor.
(PE/TR) [57]

current balancing transformer *See:* sharing transformer and current balancing transformer.
(AES/SS) 307-1969w

current-carrying See: energized.

current-carrying capacity The maximum current that a contact is able to carry continuously or for a specified period of time. *See also:* contactor.

current-carrying part A conducting part intended to be connected in an electric circuit to a source of voltage. *Note:* Non-current-carrying parts are those not intended to be connected.

(SWG/NESC/T&D/PE) C2-1997, 516-1995, C37.100-1992, C37.40-1993, C37.30-1971s

current circuit (1) (ac high-voltage circuit breakers) That part of the synthetic test circuit from which the major part of the power frequency current is obtained.
(SWG/PE) C37.081-1981r, C37.083-1999

current cutoff (power supplies) An overload protective mechanism designed into certain regulated power supplies to reduce the load current automatically as the load resistance is reduced. This negative resistance characteristic reduces over-load dissipation to negligible proportions and protects sensitive loads.
(AP/ANT) [35]

current cycle loop (substation grounding) The combination of conductors and connectors that carries the current of the circuit under test.

current delay angle (thyristor) The interval in electrical angular measure by which the starting instant of conduction is delayed in relation to operation that would occur with contin-

current amplification

A direct current is a unidirectional current in which the changes in value are either zero or so small that they may be neglected. A given current would be considered a direct current in some applications, but would not necessarily be so considered in other applications. (Std100) 270-1966w

(3) The use of certain adjectives before "current" is often convenient, as in convection current, anode current, electrode current, emission current, etc. The definition of conducting current usually applies in such cases and the meaning of adjectives should be defined in connection with the specific applications. (Std100) 270-1966w

(4) Sum of the polarization and conductance currents. (PE) 402-1974w

(2) **(relays)** An input circuit to that is applied a voltage or a current which is a measure of primary current.

current clamp (self-commutated converters) (converter circuit elements) A clamp that limits the current through a semi-conductor device.

current comparator (metering) A device by which the ratio of two currents and the phase angle between them can be measured precisely. *Note:* A common form of current comparator relies on a balance on ampere-turns produced by currents in two or more windings on one or more magnetic cores. (ELM) C12.1-1988

current compensation (excitation systems for synchronous machines) An element of the excitation system that acts to compensate for synchronous machine load current effects. *Notes:* 1. Examples are reactive current compensator and active current compensator. A reactive current compensator is a compensator that acts to modify the regulated voltage in accordance with reactive current. An active current compensator is a compensator that acts to modify the regulated voltage in accordance with active current. 2. Historically, terms such as equalizing reactor and cross current compensator have been used to describe the function of a reactive compensator. These terms are deprecated. 3. Reactive compensators are generally applied with synchronous machine voltage regulators to obtain reactive current sharing among synchronous machines operating in parallel. They function in the following two ways:

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(PE/EPG) 421.1-1986r

current, conduction *See:* conduction current.

current crest factor The ratio of the peak value of lamp current to the root-mean-square value of lamp current.

(EEC/LB) [97]

current cutoff (power supplies) An overload protective mechanism designed into certain regulated power supplies to reduce the load current automatically as the load resistance is reduced. This negative resistance characteristic reduces over-load dissipation to negligible proportions and protects sensitive loads.

(AP/ANT) [35]

current cycle loop (substation grounding) The combination of conductors and connectors that carries the current of the circuit under test.

(SUB/PE) 837-1989r

current delay angle (thyristor) The interval in electrical angular measure by which the starting instant of conduction is delayed in relation to operation that would occur with contin-

current limiting, automatic *See:* automatic current limiting.

current-limiting characteristic curve (of a current-limiting fuse) A curve showing the relationship between the maximum peak current passed by a fuse and the correlated root-mean-square available current magnitudes under specified voltage and circuit impedance conditions. *Synonyms:* peak let-

current limiter (protection and coordination of industrial and commercial power systems) A device intended to function only on fault currents of high magnitude and that may not successfully open on lesser overcurrents regardless of time. Such a device should always be used in series with a fuse, contactor, or circuit breaker to protect against overloads and low-level short circuits. Current limiters are typically added to molded-case circuit breakers, power circuit breakers, or instantaneous circuit protectors. (IA/PSP) 242-1986r

current protection *See:* protection and coordination of industrial and commercial power systems.

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